Oldman River Dam

Alberta

PUBLIC WORKS,
SUPPLY AND SERVICES

AN ACTION PLAN FOR WILDLIFE HABITAT MITIGATION FOR THE OLDMAN RIVER DAM RESERVOIR

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EXECUTIVE SUMMARY

In August 1984, the Government of Alberta announced that the Oldman River Dam would be constructed on the Oldman River, a short distance downstream of the confluence of the Castle, Crowsnest and Oldman rivers. Once completed, the dam will create a reservoir covering an area of 2420 ha at the full supply level (fsl) of 1118.6 m.

To ensure that environmental concerns resulting from the construction and operation of the reservoir were approached in a systematic and objective manner, the Planning Division of Alberta Environment[1] set out a framework for a series of studies leading to the formulation of an Environmental Mitigation/Opportunities Plan (Alberta Environment 1988). Following inventories of wildlife populations and habitats in 1986-87, a strategy for wildlife habitat mitigation was prepared. The wildlife mitigation strategy assessed the amount of habitat lost to flooding and, on the basis of three major types of mitigation methods, inventoried opportunities for habitat mitigation in the vicinity of the reservoir.

An Action Plan for wildlife habitat mitigation for the Oldman Dam Project is presented here as a supplement to the Wildlife Mitigation Strategy. The Action Plan describes actual projects which will be implemented to provide suitable replacement habitat for wildlife, the implementation schedule for the Wildlife Habitat Mitigation Plan, and an evaluation and maintenance program for the habitat projects.

Habitat Mitigation Projects

The major objective of the wildlife habitat mitigation program is to protect and develop habitat for wildlife in order to minimize the impacts of habitat loss associated with flooding of the reservoir. Towards this end, the Wildlife Habitat Action Plan includes specific projects to protect and enhance core habitat areas, develop well-defined movement corridors between the core habitat areas, and enhance and create special use sites such as wetlands and nesting ledges. Mitigation projects in the Wildlife Action Plan are described under three major categories: habitat protection, habitat enhancement and new habitat creation. Details are provided on specific mitigation techniques and project locations.

Implementation Schedule

Completion of the wildlife mitigation program will be constrained by several project activities including:

- *the filling schedule for the reservoir,*
- *attainment of a full operational level for the reservoir, and*
- *propagation of native tree and shrub stock.*

However, as the land base has already been secured for the wildlife habitat mitigation program, most aspects of the mitigation projects involving construction of facilities, excavation, recontouring, and fencing can be completed during the 1987 - 1989 period.

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[1] *As of November 1988, responsibility for construction of the Oldman River Dam Project was transferred from the Development and Operations Division of Alberta Environment to Alberta Public Works, Supplies and Services. Depending on the date of the reference, Alberta Environment and Alberta Public Works, Supplies and Services are therefore referred to as the project proponent.*

Plantings of trees and shrubs will primarily utilize native species from the Oldman River region. To provide stock that is already conditioned to the biophysical conditions in the Oldman River area, cuttings and seeds of trees and shrubs were collected during the spring and summer 1988 for propagation of containerized seedlings, bare root seedlings and cuttings. Species being grown include Douglas fir, limber pine, trembling aspen, black cottonwood, narrow leaf cottonwood, chokecherry, sandbar willow, saskatoon, hawthorn, red osier dogwood, buckbrush, snowberry, and potentilla. Most of these species will be available for planting in 1990 and 1991.

As the full supply level may not be achieved during the first year of reservoir operation (1991), the riparian marshes may not be backflooded from the reservoir until full supply level is attained. As a result, water may need to be provided and maintained by pumping water from the rivers or reservoir. Provision of water in these areas will permit the planting and establishment of riparian trees and shrubs and aquatic vegetation in and around the perimeter of these riparian wetlands, prior to full operation of the reservoir.

Several activities associated with the Wildlife Habitat Mitigation Plan will be ongoing after 1991, including: the planting of remaining tree and shrub seedlings, monitoring and maintenance of vegetation, reclamation activities in borrow sites and construction areas, and remedial measures to specific mitigation projects or project components (as required).

Evaluation and Maintenance

Evaluation of vegetation establishment, performance of structures, wildlife habitat use, and wildlife populations is an integral component of the wildlife mitigation program. As discussed in the Wildlife Mitigation Strategy Report, the wildlife mitigation program is based on a number of assumptions regarding the focus of the mitigation program (i.e., replacement of lost cover and cover/food habitats), the orientation of the mitigation program to key species of wildlife (i.e., mule deer and waterfowl), the integration of wildlife projects with some agricultural land uses and recreation, the composition of native vegetation communities, the suitability of local soil for establishment of woody cover and wetlands, and future land management responsibilities.

Monitoring of the wildlife mitigation projects and the responses of wildlife to the mitigation plan is necessary to ensure that adequate compensation is provided for lost habitat in the reservoir area. In particular, the monitoring program will assess whether specific habitat projects have been implemented or constructed according to the design standards, the success of individual habitat projects in providing habitat for wildlife, and the degree to which wildlife are utilizing habitat projects. In the event that deficiencies or problems are detected during the monitoring program, appropriate corrective measures will be implemented. Further monitoring will reveal if the corrective measures have been successful.

The monitoring program will consist of three major components, including (1) annual assessments of vegetation establishment, (2) assessments of wildife responses to dam construction and reservoir filling, and wildlife use of specific habitat mitigation projects, and (3) audits of habitat projects to determine if the habitat objectives of specific projects are being achieved, and that specific project components are performing as planned.

The Development and Operations Division of Alberta Environment and the Fish and Wildlife Division of Alberta Forestry, Lands and Wildlife will jointly administer the monitoring program for the Wildlife Habitat Mitigation Program, and be responsible for the long-term maintenance and management of the wildlife mitigation projects.

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1.0 INTRODUCTION

A recent report entitled "Opportunities for Wildlife Habitat Mitigation in the Oldman River Area" (Green and Eccles 1988) describes the conceptual approach to an integrated mitigation plan for wildlife and, based on an inventory of a large number of potential mitigation opportunities around the reservoir, describes the major techniques for wildlife habitat mitigation in the Oldman River region.

The report presented here is a supplement to Green and Eccles (1988). It describes actual projects which will be implemented by Alberta Public Works, Supplies and Services (Oldman River Dam Project)[1] to provide suitable replacement habitat for wildlife.

The major objective of the wildlife habitat mitigation program is to protect and develop habitat for wildlife in order to minimize the impacts of habitat loss associated with flooding of the reservoir. Towards this end, the mitigation plan includes the protection and enhancement of core habitat areas, development of well-defined movement corridors between the core habitat areas, and enhancement and creation of special use sites such as wetlands. Three major groups of mitigation techniques were identified for the wildlife habitat mitigation program: habitat protection, habitat enhancement and new habitat creation (Green and Eccles 1988).

Habitat protection involves the identification of areas of important wildlife habitat that will remain in the vicinity of the reservoir after flooding, and the acquisition of an adequate land base from Crown and privately-owned lands to maintain these habitats as an essential component of the Wildlife Habitat Mitigation Program. As this habitat already exists, and reduction of heavy to excessive grazing pressures will significantly improve the range capacity for wildlife, habitat protection was considered to be the most desirable technique available. Where suitable land was presently owned by the Crown, the land unit was identified and, where possible, was held for use in the wildlife habitat mitigation program. Where suitable land was privately owned, discussions with land owners proceeded in an attempt to secure an easement. Following selection of appropriate land units for habitat protection, three- or four-strand barb wire fencing will be installed to manage land use (e.g., cattle grazing, recreational use). Where suitable pasture areas for cattle are contained within a project boundary, managed grazing (e.g., seasonal grazing for an specific number of animal units) will be provided for adjacent land owners.

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The second major group of mitigation measures, ***habitat enhancement***, involves modification of sites with favourable moisture conditions for plants or shelter conditions for wildlife to produce maintenance free habitat. Snowfencing and shelterbelts along the upper edges of coulees will be used to improve snow catchment and soil moisture conditions within the coulees, thereby encouraging vegetative growth. Existing wetlands in the vicinity of the reservoir can also be enhanced through construction of nesting islands, planting of trees and shrubs along the shoreline area, seeding and maintenance of nesting cover in upland areas around the wetland, and stabilization of water levels.

To help provide movement corridors for wildlife between core habitat areas, as well as some special habitats for wildlife (e.g., new wetlands, nesting ledges for prairie falcons), a third technique, ***new habitat creation***, is required to develop habitat in areas of unfavourable moisture or shelter conditions. In most cases, a water storage facility (e.g., a check dam or riparian wetland) and some form of irrigation for trees and shrubs are central elements to the project. Riparian wetlands can also be created by constructing low profile dikes and shallowly flooded terraces along the upper edges of the reservoir that backflood with a few meters of water when the reservoir is at full supply level. Planting of aquatic and riparian vegetation around these riparian wetlands will produce low maintenance habitat capable of supporting a variety of wetland and upland associated wildlife. As almost all new habitat creation projects will require some periodic operation, maintenance and inspection, particularly for the first five years after construction, and are expensive to construct, they are generally the least cost-effective measures in the habitat mitigation program. However, new habitat creation projects provide a high diversity and good dispersion of wildlife habitat around the reservoir, and are particularly important in ensuring that core habitat areas and movement corridors are available in the more exposed sites along the reservoir edge. Without these projects, the mitigation program will be incomplete.

2.0 HABITAT MITIGATION PROJECTS

In the section below, the specific habitat protection, enhancement and creation projects that comprise the proposed wildlife habitat mitigation plan are identified. Details are provided on the approximate land area, specific mitigation techniques, and operational/management requirements. Projects have been grouped by the major types of mitigation measures to minimize repetitiveness.

2.1 HABITAT PROTECTION MEASURES

Two initiatives have been undertaken to complete the habitat protection phase of the wildlife habitat mitigation program. A land base of approximately 700 hectares (2 300 acres) has been secured from crown lands for use in the wildlife habitat mitigation program. Use of an additional 50 ha of private land (through easements, leases or purchase agreements) is required to complete the wildlife mitigation program. Projects on which land tenure has not been secured are not discussed in this report.

1. Vegetation clearing guidelines have been established to retain as much habitat as possible. This includes:

   - leaving shrubs of less than 3 meters in height within the flood zone of the reservoir;
   - staging the clearing of the reservoir over 1989 and 1990 to delay disturbance of trees and shrubs as long as possible;
   - minimizing the clearing of Douglas fir and trembling aspen communities in the area between the full supply level and the reservoir takeline; and
   - preserving stands of flood tolerant trees and shrubs in those areas of the reservoir where only shallow flooding (i.e., < 2 m) of short duration (e.g., < 5 weeks) is expected to occur during the normal operation of the reservoir, or where soil erosion will not threaten the moderate to long-term (> 25 years) survival of trees and shrubs. This also includes leaving selected stands of vegetation within the borrow areas downstream of the dam.

   Projects where clearing of Douglas fir and trembling aspen communities will be minimized include: OS9, OS13, OS14, OS39, OC3, OC12, OC17, ON3, ON7, ON23, CR13, CR15, CR18, CR19, C5, C15, C26, C27, C28, C29, C30, C37. Projects where existing riparian vegetation will be retained within the flood zone of the reservoir include: ON8, CR5, CR15, C5, C8, C9.

2. All of the land base for wildlife will be fenced to permit management of grazing and other land uses. Fencing costs will be reduced by utilizing a 3-wire fence with posts at 5 meter spacing. Fencing of the wildlife mitigation land base will add 7 km of fence to the 118 km of fence that is required for the reservoir boundary.

   A range management program will be developed by the reservoir manager, the district agriculturalist, and the Alberta Fish and Wildlife Division for suitable areas of native and improved pasture that occur within the fenced boundaries of wildlife habitat mitigation projects. Range management plans will identify acceptable standards for cattle use (e.g., the number of animal use days; timing and duration of use), and recommend rest-rotational grazing schemes (e.g., location of water sources, additional fencing as necessary) to permit cattle use without detrimental effects to wildlife habitat. Gravelled water access will be provided to most check dams in the vicinity of existing private or crown owned pasture lands.

   Plan A (Appendix I) shows the land base for the program, and the location of the fencing.

Operation and maintenance of this portion of the program is limited to the maintenance of the fence and the administration of the grazing permit system.

2.2 HABITAT ENHANCEMENT MEASURES

Habitat enhancement projects involve the improvement and/or expansion of existing sites and habitats to provide more suitable and/or larger areas of habitat for terrestrial and wetland wildlife than presently exists. Habitat enhancement projects that will be implemented in the vicinity of the Oldman River reservoir include:

1. A total of 25 km of snowfence will be installed along the perimeter fence and/or within the land base of 31 projects. Snowfencing will locally improve soil moisture conditions (as a result of increased snow retention) and reduce exposure to wind. It will also encourage the expansion of native trees and shrubs up and out of the existing coulees, and aid in the establishment of planted shelterbelts. Irregularly-shaped shelterbelts comprised of upland species of trees and shrubs such as trembling aspen, chokecherry, saskatoon, hawthorn, limber pine and Douglas fir will be planted immediately adjacent to the leeward side of the snowfencing in almost all projects. As native tree and shrub communities expand and the planted shelterbelts become established, snow catchment will increase, thereby reducing the future need for snowfencing.

As a result, long-term maintenance of snowfencing will not be required.

Snowfencing will be included as part of the following projects: OS1, OS9, OS39, OS40, OS50, OS51, OC1, OC2, OC5, OC10, OC17, OC20, OC21, OC22, OC25, ON3, ON5, ON7, CR8, CR12, CR14, CR17, CR19, CR23, CR25, C8, C15, C19, C20, C24, C26, C32, C37.

2. Five existing wetland areas will be enhanced for waterfowl through stabilization of water levels (including the provision of supplemental water supplies during periods of poor water availability), construction of earthen or rock nesting islands in the central deep water areas of the wetlands, enlargement of the wetland basin, planting of riparian shrubs and trees along some portions of the wetland shoreline, reseeding of nesting cover in adjacent upland areas, and/or maintenance of existing nesting cover.

   The following projects will include wetland enhancement: OS17, OS26 (2 wetlands), OS40, CR14.

3. Nine nesting sites for Canada geese will be constructed on several outcroppings within the reservoir that are likely to become large islands. Nest sites will include one or more log nest cribs and, in some cases, may include planting of small shelterbelts and erection of snowfencing.

   The following sites may be developed as nesting areas for Canada geese: OC11, C10, C17 (3 sites), C24, C28, C29, C30.

4. Native and improved range in several areas within the takeline is in poor condition or has been removed by cultivation. These areas will be reseeded with native or suitable commercially-available grasses to provide a stable grass cover for control of noxious weeds and soil erosion, as well as forage for wildlife and cattle. Some pasture areas will be fertilized to promote rapid regeneration of ground vegetation.

   Projects which will include reseeding/fertilization of range areas include: OS9, OS17, OS40, OC5, OC10, OC17, OC21, OC25, ON4, ON5, CR12, CR17, CR25, C8, C11, C37

All of the enhancement projects are within the fenceline provided for the habitat protection measures. Although short term maintenance will be required for establishment of aquatic and riparian vegetation in enhanced wetlands, tree and shrub establishment for nesting cribs, and range reseeding programs, no moderate or long term maintenance (i.e., > 5 years) of these projects will be

required. However, a process for administration and management of grazing permits within the wildlife mitigation areas will need to be established.

2.3 NEW HABITAT CREATION

New habitat creation projects involve the construction or significant modification of existing sites to provide habitats with significantly different biological and physical conditions than existed previously. New habitat creation projects will include:

1. The accumulation and storage of water in check dams, dugouts and newly-created wetlands, and the distribution of water in areas where soil moisture conditions may presently be limiting the establishment of dense tree and shrub cover. The accumulation and storage of water and the ability to provide water to the newly-planted seedlings on a frequent basis is essential to the successful establishment of new tree and shrub cover in exposed upland areas.

   Water storage structures will range from small dugouts with shallow catchment basins to small (< 7 m in height) dams in several coulees. In areas where sufficient natural runoff exists to provide a two year supply of water, no ancillary measures are necessary. Where the natural runoff is insufficient, supplementary measures will be considered such as snowfencing and shelterbelts to improve and/or concentrate snow catchment, subsurface drainage to capture artesian springs, and pumping of water from the Oldman reservoir using electric, solar or wind powered systems.

   Stored water will primarily be used to water tree and shrub seedlings that are located downstream of the check dams and dugouts, using subsurface irrigation tubing with slow release emitters. Methods are currently being investigated to automate the operation of these irrigation systems. Water levels in the check dams and dugouts will fluctuate seasonally in response to snowmelt and rainfall, evaporation, water removal for watering of trees and shrubs, and livestock use. In two locations, check dams will be used to maintain stable water levels in newly-created wetland basins. Riparian shrubs and emergent aquatic vegetation will be planted along the perimeter of most check dams and dugouts to provide vegetation cover and food for terrestrial and wetland wildlife. Thirty-one (31) check dams and dugouts are proposed.

   Check dams or dugouts will be constructed in the following habitat mitigation projects: OS9, OS39, OC5 (4 check dams), OC10, OC16 (2 check dams), OC20, OC21 (2 check dams), OC22, OC26

(3 check dams), ON4, ON5, CR 8, CR17, CR23 (2 check dams), CR25 (2 check dams), C19 (2 check dams), C20, C26 (2 check dams).

2. New riparian habitat will be provided through the construction of terraces and/or dikes within the upper flood zone of the reservoir (i.e., up to 3 m below full supply level). Riparian wetlands will be constructed at 23 locations. These sites will backflood when the reservoir is brought to full supply level, and hold water 0.6 m below full supply level when the reservoir is lowered. Where appropriate, nesting islands for waterfowl and Canada geese will be constructed in these wetlands. Narrow leaf cottonwoods, sandbar willow, sedges and aquatic plants will be planted in the area immediately at and below full supply level. Riparian trees and shrubs such as black cottonwoods, sandbar willow, red osier dogwood, and white spruce will be planted in the areas immediately above full supply level. The proposed riparian wetland projects will replace some of the bottomland habitats that will be lost to flooding, and will provide several core habitat areas.

   Riparian wetlands will be constructed as part of the following mitigation projects: OS40 (2 sites), OS50, OS51, OS52, OS53, OS54, OC15 (2 sites), OC21, ON2, ON23, CR13, CR14 (2 sites), CR15, C9, C11, C15 (3 sites), C19, C24, C32.

3. New nesting cavities for prairie falcons and ferruginous hawks will be constructed on cliffs above the full supply level of the reservoir or on cliffs adjacent to the reservoir edge (i.e., up to 2.0 km away from the reservoir). New nesting ledges for Canada geese may also be constructed on cliffs adjacent to the reservoir. Methods are being investigated to modify existing mudstone and sandstone cliffs using explosives and/or sand blasting. Several of these techniques have been used successfully in other areas of Alberta to create nesting ledges and cavities for these species (R. Fyfe, pers. comm.). Only those cliffs that do not currently provide suitable nesting sites above full supply level will be modified. Due to the classified nature of information on raptor nesting sites, these projects are not indentified in this report.

4. On the request of the local wildlife advisory sub-committee, two marmot colonies that are presently located in the reservoir area will be transplanted to new locations above full supply level. In one case, a rock pile will be constructed adjacent to suitable foraging habitat, to provide a suitable core area for burrows and loafing/observation sites.

Most of the proposed new habitat creation projects will involve measures as in items (1) and (2) above.

In general, new habitat creation projects will be the most difficult to establish and most will require an operations and maintenance commitment. The proposed check dams and dugouts will require annual inspection and maintenance to ensure their serviceability, stability and safety. Although the subsurface irrigation systems will be automated, routine inspections will be required to ensure operation. It is anticipated that all irrigation systems will be operated for a minimum of 5 years to allow trees and shrubs to become well established, thereby creating a micro-climate that is self-sustaining. Operations manuals and spare parts will be provided for the operations personnel to operate, maintain and inspect these mechanical systems at appropriate intervals.

3.0 IMPLEMENTATION SCHEDULE

Completion of the wildlife mitigation program will be constrained by several project activities including:

- the filling schedule for the reservoir,
- attainment of a full operational level for the reservoir, and
- propagation of native tree and shrub stock.

However, as the land base has already been secured for the wildlife habitat mitigation program, most aspects of the mitigation projects involving construction of facilities, excavation, recontouring, and fencing can be completed during the 1987 - 1989 period.

Plantings of trees and shrubs will primarily utilize native species from the Oldman River region. To provide stock that is already conditioned to the biophysical conditions in the Oldman River area, cuttings and seeds of trees and shrubs were collected during the spring and summer 1988 for propagation of containerized seedlings, bare root seedlings and cuttings. Species being grown include Douglas fir, limber pine, trembling aspen, black cottonwood, narrow leaf cottonwood, chokecherry, sandbar willow, saskatoon, hawthorn, red osier dogwood, buckbrush, snowberry, and potentilla. Most of these species will be available for planting in 1990 and 1991.

As the full supply level of the reservoir may not be achieved during the first year of operation (1991), the riparian marshes may not be backflooded from the reservoir until full supply level is attained. As a result, water may need to be provided and maintained by pumping water from the rivers or reservoir. Provision of water in these areas will permit the planting and establishment of riparian trees and shrubs and aquatic vegetation in and around the perimeter of these riparian wetlands, prior to full operation of the reservoir.

Allowing for the above constraints to the completion of the wildlife mitigation program, the following scheduled is proposed for completion of the habitat projects:

1987 - Initiate test program at the Glass Property (NE 16/SE 21 TWP 7 Rg 29 W4M)
- Undertake a preliminary land base assessment (e.g., title, leases, reservations.
- Complete assessment of potential habitat mitigation projects
- Commence reservoir boundary fencing

1988
- Continue test program at the Glass Property
- Select preferred mitigation projects and develop the Mitigation Plan
- Complete the assembly of a land base for the Mitigation Plan
- Design hydraulic and revegetation components for each project
- Continue reservoir boundary fencing
- Commence propagation of native trees and shrubs
- Modify suitable cliffs for raptor and geese nesting sites
- Monitor wildlife response to construction activities

Critical Activities
- Apply for licenses for check dams
- Collect cuttings and seed for native trees and shrubs to be planted in 1990-1993

1989
- Monitor habitat program at the Glass Property
- Complete the reservoir boundary fencing
- Construct dugouts and check dams for new habitat creation projects (as licensing permits)
- Commence construction of dikes and terraces for riparian marshes and nesting islands (as time permits)
- Complete snowfencing for shelterbelts and snow catchment areas
- Continue modification of suitable cliffs for raptor and geese nesting sites
- Monitor vegetation establishment and response of wildlife populations and distributions to construction and clearing activities

Critical Activities
- All check dams must be completed by April 1990

1990
- Complete construction of all dugouts and check dams
- Continue construction of riparian wetlands
- Install subsurface irrigation lines at creation projects
- Commence planting of native trees and shrubs
- Prepare habitat designs for borrow pit reclamation
- Monitor vegetation and structural performance of mitigation projects
- Monitor wildlife response to construction activities and habitat changes

Critical Activities
- Complete all riparian wetland developments
- Complete salvage of material (soil, vegetation) from reservoir floor

1991 - Complete plantings of native trees and shrubs
- Commence reclamation activities at the borrow sites and other project sites
- Monitor vegetation and structural performance of mitigation projects
- Monitor wildlife response to construction activities and habitat changes

Several activities will be ongoing after 1991, including:

1. Planting of remaining tree and shrub seedlings (predominantly those species that were not ready for planting in 1991).

2. Monitoring and maintenance of vegetation will continue until trees, shrubs and ground covers are well established.

3. Reclamation activities in borrow sites and construction areas will continue as necessary.

4. Remedial measures to specific mitigation projects or project components to ensure adequate wildlife habitat is established.

4.0 EVALUATION AND MAINTENANCE

4.1 EVALUATION OF HABITAT PROJECTS

Evaluation of vegetation establishment, performance of structures, wildlife habitat use, and wildlife populations is an integral component of the wildlife mitigation program. As discussed in the Wildlife Mitigation Strategy Report (Green and Eccles 1988), the wildlife mitigation program is based on a number of assumptions regarding the focus of the mitigation program (i.e., replacement of lost cover and cover/food habitats), the orientation of the mitigation program to key species of wildlife (i.e., mule deer and waterfowl), the integration of wildlife projects with some agricultural land uses and recreation, the composition of native vegetation communities, the suitability of local soil for establishment of woody cover and wetlands, and future land management responsibilities.

Monitoring of the wildlife mitigation projects and the responses of wildlife to the mitigation plan is necessary to ensure that adequate compensation is provided for lost habitat in the reservoir area. In particular, the monitoring program will assess whether specific habitat projects have been implemented or constructed according to the design standards, the success of individual habitat projects in providing habitat for wildlife, and the degree to which wildlife are utilizing habitat projects. In the event that deficiencies or problems are detected during the monitoring program, appropriate corrective measures will be implemented. Further monitoring will reveal if the corrective measures have been successful.

The evaluation program will consist of three major components:

1. Assessments of Vegetation: Vegetation monitoring will include annual assessments of the survival of tree and shrub seedlings, surveys of ground covers in newly-seeded and/or fertilized pasture areas, inspections of transplanted and naturally invading aquatic vegetation in enhanced and newly-created wetlands and check dams, and range surveys in rest-rotational pasture areas. Vegetation monitoring will provide information on the establishment and response of native vegetation in the habitat projects and, in particular, will highlight the need for supplemental or replacement plantings of seedlings, ground covers and aquatic plants.

2. Assessments of Wildlife Distributions and Habitat Use: The wildlife monitoring component will require assessment of the response of wildlife to (i) the dam construction and clearing activities, and (ii) the habitat mitigation projects.

   Assessment of the responses of wildlife to the dam construction and clearing activities will require monitoring of changes in the

abundance and distribution of several species and/or groups of wildlife that are representative of the habitat requirements of most wildlife in the Oldman River region. Recommended key wildlife species/groups include: mule deer, waterfowl, raptors, and songbirds. Proposed surveys include:

- systematic surveys of mule deer populations in the vicinity of the Oldman project, and in the Porcupine and Lundbreck Hills during the early and late winter periods,

- systematic surveys of waterfowl populations along the Oldman River (in the vicinity of the project area) and in existing wetlands near the reservoir. Proposed surveys include an early spring breeding survey, a late spring nesting survey, brood counts, and a fall staging survey.

- annual surveys of nesting and non-breeding prairie falcons, ferruginous hawks and other raptors in the Oldman Project area. Data will also be obtained on the nesting success of prairie falcons and ferruginous hawks in the immediate vicinity of the reservoir. Banding of nesting prairie falcons and ferruginous hawks is proposed to permit tracking of nesting pairs during and following dam construction, and the modification of nesting cliffs for these species.

- breeding bird counts for song birds and upland game birds in the reservoir area. Permanent survey blocks will be established in representative vegetation communities.

Baseline data are available for ungulates and raptors from wildlife surveys conducted in 1985 - 1986. Systematic surveys during dam construction will be conducted in mid-winter 1988-89 and 1990-91. Post-flooding surveys will then be conducted, at minimum, on a biennial basis.

Monitoring of the responses of wildlife to the mitigation projects will involve annual or biennial assessments of the use of representative habitat projects by key species and groups of wildlife. Although data from the surveys described above will be used, information will also be obtained on the use of tree and shrub plantings by ungulates (e.g., browse surveys, pellet group counts), and wetland use by waterfowl (e.g., nesting surveys, staging counts).

3. Audits of Habitat Projects: Habitat designs for specific projects will generally involve hydraulic structures (e.g., check dams, subsurface irrigation systems), physical structures (e.g., perimeter fencing, snowfencing), vegetation components, and/or specialized habitat structures (e.g., nest cribs, nesting ledges, nesting islands,

rock piles). In combination, these project components should provide specific types of habitat for terrestrial and/or wetland-associated wildlife.

Audits of habitat projects will be used to determine if the habitat objectives of specific projects are being achieved, and that specific project components are performing as planned. Project audits will involve a combination of one or more of the following, depending on the complexity and scope of the habitat project:

- annual inspections of check dams and dugouts to assess water retention capabilities,
- annual inspections of subsurface irrigation systems to ensure that adequate water is being provided to tree and shrub seedlings,
- annual inspections of barbed-wire fencing and snowfencing,
- seasonal inspections of rest-rotational pastures to assess range productivity, and to ensure compliance with the range management plan, and
- annual assessment of habitat suitability in representative habitat projects. Quantification of habitat suitability will require measurement of vegetation features, terrain features, and physical structures (data from the vegetation monitoring and wildlife monitoring programs can be used to assist in assessment of habitat suitability), and use of field data in computerized habitat assessment models.

Project audits will allow early identification and correction of project deficiencies or problems, as well as the potential to identify other habitat enhancement or creation opportunities.

These three major types of monitoring programs are important to the Wildlife Habitat Mitigation Program, not only in evaluating the overall success of the projects, but also in developing and improving state-of-the-art methodologies for future mitigation programs in riverine/prairie environments.

During the implementation phase, the Fish and Wildlife Division of Alberta Forestry, Lands and Wildlife and Alberta Public Works, Supplies and Services will jointly administer the evaluation program for the Wildlife Habitat Mitigation Program. The Fish and Wildlife Division will manage the biological monitoring study (e.g., vegetation establishment, wildlife habitat use, wildlife populations), whereas Alberta Public Works, Supplies and Services will conduct the environmental inspections of specific structures and projects.

4.2 LONG TERM MAINTENANCE AND MANAGEMENT OF WILDLIFE HABITAT MITIGATION PROJECTS

Upon completion of the Wildlife Habitat Mitigation Program, maintenance and management responsibilities will be shared between Alberta Forestry, Lands and Wildlife and the Development and Operations Division of Alberta Environment[1]. The Development and Operations Division will operate the watering systems, maintain all physical structures (e.g., fencing, check dams, dikes and dugouts), and administer grazing permits and vegetation management for the habitat projects. The Alberta Fish and Wildlife Division will assist in the management and administration of grazing permits and vegetation management through regular range and habitat assessments, and recommendations on habitat maintenance.

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[1] Following the completion of the Oldman dam and reservoir, Alberta Public Works, Supplies and Services will transfer the responsibility for operation and maintenance tof the dam and reservoir to the Development and Operations Divison of Alberta Environment.

5.0 LITERATURE CITED

Green, J.E. and T.R. Eccles. 1988. A strategy for wildlife habitat mitigation for the Oldman River dam reservoir. Prep. for the Oldman River Project Office, Alberta Public Works, Supplies and Services by The Delta Environmental Management Group Ltd. 38 pp.

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PUBLIC WORKS
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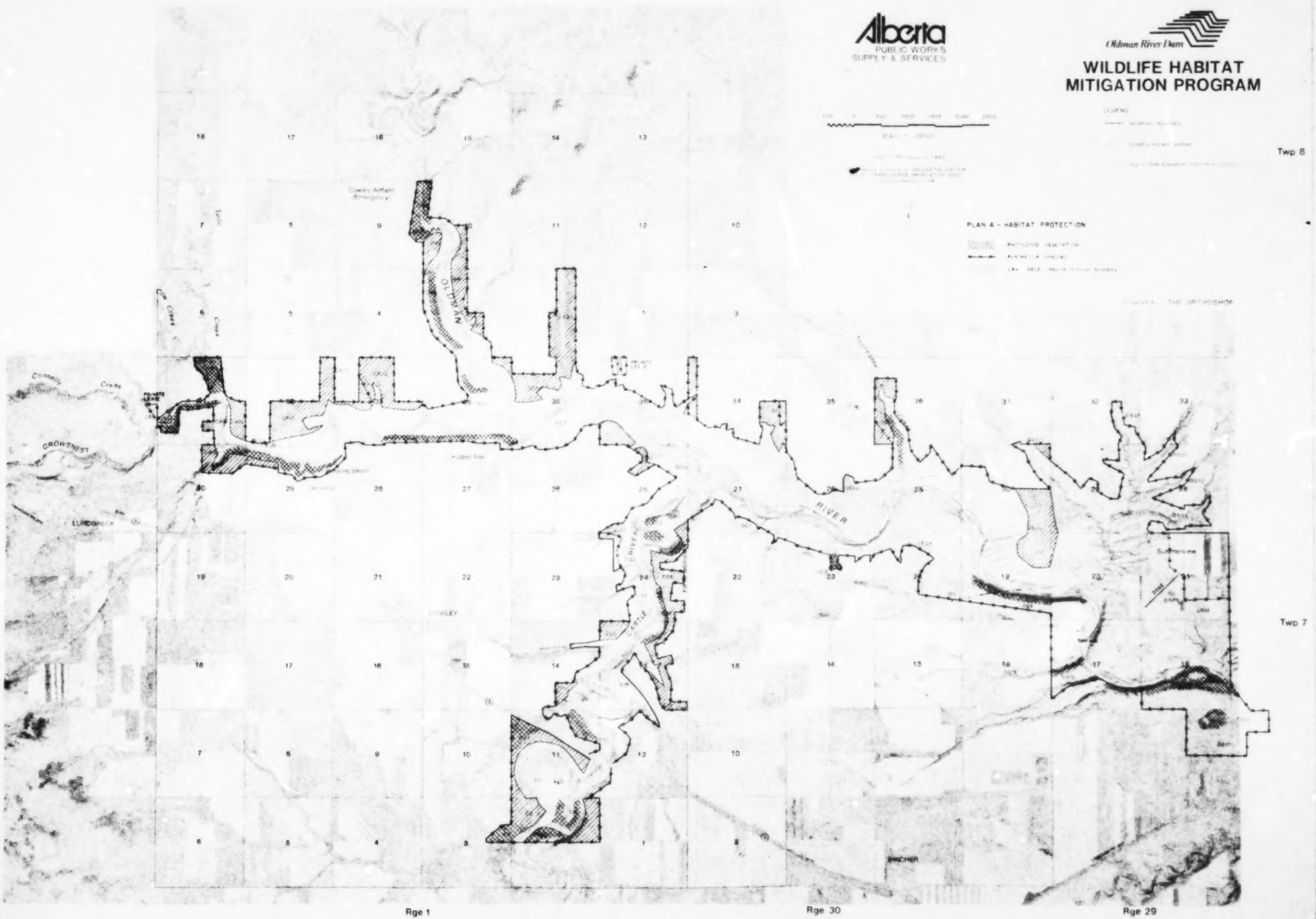
Oldman River Dam

WILDLIFE HABITAT MITIGATION PROGRAM

PLAN A – HABITAT PROTECTION



Alberta
PUBLIC WORKS
SUPPLY & SERVICES

Oldman River Dam

WILDLIFE HABITAT MITIGATION PROGRAM

SCALE 1: 25000

LEGEND

PLAN B - HABITAT ENHANCEMENT

- SNOW FENCE
- WETLAND ENHANCEMENT
- GOOSE NESTING SITES
- RANGE IMPROVEMENT

Compiled by: THE ORTHOSHOP

Twp 8

Twp 7

Rge 1

Rge 30

Rge 29

Alberta
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WILDLIFE HABITAT MITIGATION PROGRAM

SCALE 1 : 25000

Date of Photography: 1982

The mapping is based on GEODETIC DATUM and a TRANSVERSE MERCATOR GRID
Central Meridian 114

LEGEND

Reservoir Boundary

Wildlife Project Number

Top of Dam Elevation (1121.79 m) (White line)

PLAN C - NEW HABITAT

△ CHECKDAMS

○ RIPARIAN MARSHES

Compiled by : THE ORTHOSHOP

Twp 8

Twp 7

Rge 1

Rge 30

Rge 29